



Serial No. 09/519,719
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IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Applicant: **Noorbakhsh, et al.**

Case: **4150**

Serial No.: **09/519,719**

Filed: **March 7, 2000**

Examiner: **Luz L. Alejandro Mulero**

Group Art Unit: **1763**

**TITLE: TEMPERATURE CONTROLLED SEMICONDUCTOR
PROCESSING CHAMBER LINER**

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S I R:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on March 2, 2004 and received in the Patent Office on March 4, 2004.

The fee for filing this Appeal Brief is \$330.00. It is believed that a one-month extension of time is due. The Commissioner is hereby authorized to charge these fees of \$440.00, and any additional fees that may be required, or credit any overpayment to Deposit Account No. 20-0782. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

June 3, 2004

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CERTIFICATE OF MAILING UNDER 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited on June 3, 2004 with the United States Postal Service as first-class mail, with sufficient postage, in an envelope addressed to Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Allyson M. DeVesty
Signature

6-3-04
Date of signature



IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Applicant: **Noorbakhsh et al.**

Case: **4150**

Serial No.: **09/519,719**

Filed: **March 7, 2000**

Examiner: **Luz L. Alejandro Mulero**

Group Art Unit: **1763**

Confirmation No.: **8956**

Title: **TEMPERATURE CONTROLLED SEMICONDUCTOR PROCESSING
CHAMBER LINER**

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir:

The following Appeal Brief is submitted pursuant to the Notice of Appeal filed on March 2, 2004 and received in the Patent Office on March 4, 2004 in the above-identified application.

REAL PARTY IN INTEREST

The real party in interest is:

Applied Materials, Inc.
P.O. Box 450A
Santa Clara, CA 95052

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01 FC:1402 330.00 DA

06/09/2004 DENMANU1 00000080 200782 09519719

02 FC:1251 110.00 DA

RELATED APPEALS AND INTERFERENCES

The Appellants, Appellants' legal counsel, or the Assignee knows no other appeals or interferences that directly affect, or are directly affected by, or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 11-24, 26-28, 37-38, 40, 42 and 47-58 stand under final rejection, from which rejection this appeal is taken.

SUMMARY OF INVENTION

In one embodiment, a thermally controlled liner for lining a semiconductor processing chamber comprises a first liner, a second liner, or both a first and a second liner. The first liner is adapted for lining a side wall of the processing chamber, and the second liner is adapted for lining a substrate support disposed in the chamber. The first liner or the second liner has a thermally conductive body including one or more fluid passages formed at least partially therein. The fluid passages are coupled to a fluid supply system. The thermally controlled chamber liner maintains a predetermined temperature by running coolant fluid or heating fluid from a fluid supply through the fluid passages. In one embodiment, the first liner and the second liner are coupled by a base member that is adapted to line a bottom of the chamber. The integral base coupling of the liners allows the fluid to be efficiently routed to second liner disposed against the substrate support while enabling the entire liner assembly, including the first and second liners, to be easily removed from the processing chamber for cleaning and replacement.

By maintaining a predetermined temperature, the chamber liner manages the deposition of films upon the chamber liner by both minimizing the amount of material deposited upon the liner and maintaining the liner at a uniform temperature with minimal thermal cycling. The controlled temperature of the liner surface discourages deposition, and the substantially constant temperature (*i.e.*,

limited temperature cycling) reduces stress formation in films deposited on the liner, thus increasing service life of the liner while minimizing film fracture and the problem of particulate generation associated with the fracturing of films formed on the liner.

ISSUES

Whether:

- A. Claims 53 and 58 are patentable under 35 U.S.C. §112;
- B. Claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 are patentable under 35 U.S.C. §103 over *Pu et al.* (PCT Application No. WO 99/48130) or *Shan et al.* (European Patent Application No. EP 0 814 495), in view of *Masuda et al.* (United States Patent No. 6,171,438);
- C. Claim 18 is patentable under 35 U.S.C. §103 over *Pu et al.* or *Shan et al.* in view of *Masuda et al.*, and further in view of *Reimold et al.* (German Patent No. DE 31 10489);
- D. Claims 19, 54 and 56-58 are patentable under 35 U.S.C. §103 over *Pu et al.* or *Shan et al.* in view of *Masuda et al.*, and further in view of *Collins et al.* (European Patent Application No. EP 0 892 422, hereinafter referred to as "*Collins I*");
- E. Claims 21-24 and 49-50 are patentable under 35 U.S.C. §103 over *Pu et al.* in view of *Masuda et al.*, and further in view of *Shan et al.* (European Patent Application No. EP 0 814 495);
- F. Claims 42 is patentable under 35 U.S.C. §103 over *Pu et al.* or *Shan et al.* in view of *Masuda et al.*, and further in view of *Collins et al.* (PCT Application WO 97/08734, hereinafter referred to as "*Collins II*");

G. Claims 26 and 28 are patentable under 35 U.S.C. §103 over *Shan et al.* in view of *Zhao et al.* (European Patent Application No. 0 855 735);

H. Claim 27 is patentable under 35 U.S.C. §103 over *Shan et al.* in view of *Zhao et al.*, and further in view of *Takeuchi et al.* (United States Patent No. 5,824,158);

I. Claim 37 is patentable under 35 U.S.C. §103 over *Shan et al.* in view of *Zhao et al.*, and further in view of *Banholzer et al.* (United States Patent No. 5,565,058);

J. Claim 52 is patentable under 35 U.S.C. §103 over *Shan et al.* in view of *Masuda et al.*, and further in view of *Zhao et al.*

GROUPING OF CLAIMS

The claims have been grouped as follows. Claims 11-17 and 20 have been grouped together, with claim 11 being representative of this grouping. Claims 21-24 have been grouped together, with claim 21 being representative of this grouping. Claims 26 and 28 have been grouped together, with claim 26 being representative of this grouping. Claims 38 and 40 have been grouped together, with claim 38 being representative of this grouping. Claims 47, 48 and 55 have been grouped together, with claim 47 being representative of this grouping. Claims 49-50 have been grouped together, with claim 49 being representative of this grouping. Claims 18, 19, 27, 37, 42, 51, 52, 53, 54, 56, 57 and 58 individually stand on their own.

THE REFERENCES

The Examiner relies on the following references:

Author	Publication Title or Reference number	Publication Date
<i>Pu et al.</i>	PCT Patent No. WO 99/48130	September 22, 1999
<i>Masuda et al.</i>	US Patent No. 6,171,438	January 9, 2001
<i>Reimold et al.</i>	German Patent No. DE 31 10489	October 20, 1982
<i>Collins et al.</i>	European Patent No. EP 0 892 422	January 20, 1999
<i>Shan et al.</i>	European Patent No. EP 0 814 495	December 29, 1997
<i>Collins et al.</i>	PCT Patent No. WO 97/08734	March 6, 1997
<i>Zhao et al.</i>	European Patent No. EP 0 814 495	July 29, 1998
<i>Takeuchi et al.</i>	US Patent No. 5,824,158	October 20, 1998
<i>Banholzer et al.</i>	US Patent No. 5,565,058	October 15, 1996

BRIEF DESCRIPTION OF THE REFERENCES

PCT Patent No. WO 99/48130 to *Pu et al.* (hereinafter referred to as "*Pu*") teaches a plasma processing chamber containing two individually removable shields: a dielectric outer shield disposed adjacent a chamber wall, and an anodized aluminum inner shield disposed adjacent a substrate support. Specifically, the shields to which *Pu* refers are disclosed more fully by *Shan*, which teaches that the outer dielectric shield primarily functions to control the DC bias of the substrate support by reducing the surface area of the chamber wall through which RF power is capacitively coupled to a positively charged plasma (see, *Shan*, page 5, lines 7-10). As an incidental benefit, the shields also function to prevent reaction products from depositing on the substrate support and the chamber walls, thereby facilitating chamber cleaning (see, *Shan*, page 9, lines 17-20).

United States Patent No. 6,171,438 to *Masuda et al.* (hereinafter referred to as "*Masuda*") teaches a plasma processing chamber having a hollow jacket held adjacent the chamber wall for controlling the temperature of the wall's inner surface so that polymerized material is drawn onto the jacket's surface to form a film. The jacket is coupled to a pipe or line that extends from outside of the chamber and through the wall of the chamber to supply a heat-exchanging medium into a hollow space in the jacket (see, *Masuda*, column 7, lines 23-28).

German Patent No. DE 31 10489 to *Reimold et al.* (hereinafter referred to as "*Reimold*") teaches a heat exchanger comprising a jacket tube that supports a housing ring on each end. Each housing ring has on its circumference a number of bosses for establishing a plurality of connections to other components, including components for supplying or removing a heat exchanging medium (see, *Reimold*, Figure 1). One of the bosses is further adapted to engage a connecting bore.

European Patent No. EP 0 892 422 to *Collins et al.* (hereinafter referred to as "*Collins I*") teaches a plasma processing chamber having an interior volume within which a pedestal is disposed. An annular passage is formed around the circumference of the pedestal and is connected to a pumping annulus that is adapted to evacuate the chamber (see, *Collins I*, column 11, lines 28-32). A pair of magnets is disposed within the walls of the chamber, on opposite sides of the annular passage (see, *Collins I*, Figures 17A-B). The magnets are adapted to confine the plasma to prevent plasma flow from escaping the chamber and entering the pumping annulus (see, *Collins I*, column 14, lines 21-24).

European Patent No. EP 0 814 495 to *Shan et al.* (hereinafter referred to as "*Shan*") teaches a plasma processing chamber containing two individually removable shields: a dielectric outer shield disposed adjacent a chamber wall, and an anodized aluminum inner shield disposed adjacent a substrate support. The outer dielectric shield primarily functions to control the DC bias of the substrate support by reducing the surface area of the chamber wall through which RF power is capacitively coupled to a positively charged plasma (see, *Shan*, page 5, lines 7-10). As an incidental benefit, the shields also function to

prevent reaction products from depositing on the substrate support and the chamber walls, thereby facilitating chamber cleaning (see, *Shan*, page 9, lines 17-20).

PCT Patent No. WO 97/08734 to *Collins et al.* (hereinafter referred to as "*Collins I*") teaches an optional liner for covering the surfaces of a pumping annulus in a processing chamber, to prevent polymers from accumulating on the pumping annulus. The liner is thermally coupled to a cold sink for regulating, from the exterior, the temperature of the liner and for controlling polymer materials that are attracted to the pumping annulus (see, *Collins II*, page 65, line 34 – page 66, line 8).

European Patent No. EP 0 814 495 to *Zhao et al.* (hereinafter referred to as "*Zhao*") teaches a chemical vapor deposition chamber having a substrate pedestal, a chamber lid liner, a chamber wall liner, and a showerhead that has a plurality of nozzles for distributing a flow of processing gas over a substrate positioned on the pedestal (see, *Zhao*, column 13, lines 43-45 and column 14, lines 43-49).

US Patent No. 5,824,158 to *Takeuchi et al.* (hereinafter referred to as "*Takeuchi*") teaches a plasma processing system comprising a vacuum vessel having a gas inlet and an exhaust port (see, *Takeuchi*, column 11, lines 29-31). A gas inlet nozzle extends through a vessel side wall and is adapted to jet a CVD process gas into the vessel from the gas inlet. The nozzle is comprised of quartz glass in order to prevent the inclusion of impurities in the process gas (see, *Takeuchi*, column 11, lines 53-56).

US Patent No. 5,565,058 to *Banholzer et al.* (hereinafter referred to as "*Banholzer*") teaches a vacuum chamber in which a quartz shield is positioned within the chamber to surround a substrate support (see, *Banholzer*, column 2, lines 33-35). The quartz shield is bead blasted to make the surface rough or irregular (see, *Banholzer*, column 3, lines 6-9). The irregularity of the shield surface facilitates breakup of films deposited on the shield into sections that are small with respect to flake sizes, thereby hindering flaking, and also provides a larger surface area upon which films can deposit (see, *Banholzer*, column 3, lines

15-21).

ARGUMENT

THE ISSUES UNDER 35 U.S.C. §112

It is submitted that claims 53 and 58 are adequately supported by the Appellants' Specification.

A. Claims 53 and 58

The Examiner's conclusions regarding the patentability of claims 53 and 58 under 35 U.S.C. §112 are incorrect. In particular, the Appellants submit that the Specification provides adequate support for all of the limitations recited by claim 53, and by claim 58 which depends therefrom.

Specifically, the Examiner asserts that there is no support in the specification for "a semiconductor processing chamber as claimed, wherein a passage is disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough", as recited by independent claim 53. The Appellants submit that the disputed limitation is supported, for example, by page 4, lines 18-28 and page 7, lines 24-36 of the Specification, and by Figure 3, which describe a liner for lining a processing chamber wall, the liner having a fluid passage formed in a portion thereof that is adapted to flow a heat transfer fluid. The passage is fluidly isolated from the chamber volume, and those skilled in the art will recognize that the passage is positioned between the chamber wall and a deposition surface (*i.e.*, exposed to the chamber volume/processing environment) of the liner.

Thus, the Appellants respectfully submit that claim 53, and claim 58 that depends therefrom, are supported by the Specification. Therefore, the Appellants submit that claims 53 and 58, as they now stand, fully satisfy the requirements of 35 U.S.C. §112 and are patentable thereunder.

THE ISSUES UNDER 35 U.S.C. §103

It is submitted that a proper interpretation of *Pu* and *Masuda*, as proposed by the Examiner in the Final Office Action does not teach or show the invention recited in the Appellants' claims.

A. 35 U.S.C. §103 – *Pu* in view of *Masuda*

The Examiner's conclusions regarding the patentability of claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 over *Pu* in view of *Masuda* are incorrect. In particular, there is no motivation to combine *Pu* and *Masuda* in a manner that teaches or suggests all of the limitations recited by claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55.

Primarily, the Appellants submit that there is no motivation for modifying the system taught by *Pu* with the teachings of *Masuda* in a manner that would yield the claimed invention. *Pu* teaches two removable shields that cover portions of a processing chamber: an inner anodized aluminum shield that lines a substrate support and an outer dielectric shield that lines a chamber wall. As disclosed by *Shan*, which is incorporated by *Pu* to more fully disclose the shields, the outer dielectric shield primarily functions to control the DC bias of the substrate support by reducing the surface area of the chamber wall through which RF power is capacitively coupled to a positively charged plasma (see, *Shan*, page 5, lines 7-10). In fact, *Shan* discloses the deposition shielding properties of the outer dielectric shield as being incidental to the primary purpose of controlling the substrate support's DC bias. As further disclosed by *Shan*, the ability of the outer dielectric shield to control the substrate support's DC bias is directly related to the thickness of the outer shield (see, *Shan*, page 2, lines 43-46).

By contrast, *Masuda* teaches a hollow jacket positioned adjacent to a chamber wall and having a hollow space formed therein for circulating a fluid. Forming a similar hollow space for fluid flow within the outer shield taught by *Pu* would impede the primary function of the outer shield, which is to control the DC bias of the substrate support. This function is directly dependent upon the

thickness of the outer shield, which would have to be thicker in order to accommodate a space large enough for a useful amount of heat transfer fluid to circulate therethrough. Moreover, the presence of a hollow space and/or fluid within the outer shield (*i.e.*, lining the chamber wall) may negatively interfere with the dielectric properties of the shield, thereby frustrating the primary goal of controlling DC bias, as stated by *Shan*. In addition, the formation of the shield from a dielectric material, as taught by *Pu*, would make the temperature control goals of *Masuda* more difficult to achieve.

MPEP §2141.03 requires the Examiner to consider the prior art in its entirety. "A prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention". MPEP §2141.03, *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed Cir. 1983), cert. denied, 469 U.S. 851 (1984). The Examiner has not considered either *Pu* or *Masuda* as a whole, because there is no motivation to combine the particular shields/liners taught by *Pu* and *Masuda*. The dielectric shield taught by *Pu* and the heat-exchanging jacket taught by *Masuda* are not compatible structures and are incorporated into the respective plasma chambers to address very different problems. Therefore, there is no motivation to combine *Pu* and *Masuda* in a manner that would yield the claimed invention.

By alleging that the Appellants' invention is taught by a combination of *Pu* and *Masuda*, the Examiner is clearly using hindsight to pick and choose elements from the references to support his rejection. It is impermissible to use the claims as a framework from which to choose among individual references to recreate the claimed invention. *W. L. Gore Associates, Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 312 (1983). Moreover, the mere fact that a prior art structure could be modified to produce the claimed invention would not have made the modification obvious unless the prior art suggested the desirability of the modification. *In re Fritch*, 23 U.S.P.Q. 2d 1780, 1783, Fed. Cir. (1992); *In re Gordon*, 221 U.S.P.Q. 1125, 1127, Fed. Cir. (1984) (emphasis added). The rules applicable for combining references provide that there must be a suggestion from

within the references to make the combination. *Uniroyal v. Rudkin-Wiley*, 5 U.S.P.Q. 2d 1434, 1438 (Fed. Cir. 1988); *In re Fine*, 5 U.S.P.Q. 2d at 1599 (emphasis added). Therefore, there is no justification for combining *Pu* and *Masuda* in a manner that obviates the claimed invention.

The burden for establishing a prima facie case of obviousness falls on the Examiner. See, *MPEP* §2142. A basic requirement of establishing a prima facie case of obviousness is that the combination of prior art references must teach or suggest all the claim limitations and that there must be a motivation to combine the references. See, *MPEP* §2143.

The Examiner has failed to establish a prima facie case because there is no motivation to combine *Pu* and *Masuda* in a manner to teach, show or suggest forming a fluid passage within a processing chamber liner having a base and at least one wall, as claimed by Appellants. The Examiner is using hindsight to employ the claimed invention as a framework to select elements from two divergent teachings. As such, the Examiner fails to properly show that *Pu* in view of *Masuda* teaches, shows or suggests all of the features required to sustain the Examiner's rejection under 35 U.S.C. §103 of the Appellants' claimed invention. The Examiner's rejections with regard to specific claims will be addressed more fully below.

1. Claims 11-17 and 20

Pu and *Masuda* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 11, from which claims 12-17 and 20 depend. Specifically, there is no suggestion or motivation for combining the teachings of *Pu* and *Masuda* in a manner that would teach, show or suggest a chamber liner having a base substantially covering the bottom of the chamber body, the base having a substantially annular passage formed therein and having an inlet and outlet adapted to circulate a fluid through the passage, as recited by claim 11.

Even if the combination of the references was desirable, the combination of *Pu* and *Masuda* does not teach or suggest the claimed invention, because, at most, the combination would only teach a chamber liner having a passage formed in a sidewall, e.g., a portion lining a wall of the processing chamber. The Applicants claim a chamber liner having a base that “substantially cover[s] the bottom of the chamber body, the base having a substantially annular passage formed therein ...”, as recited by independent claim 11. *Pu* and *Masuda* do not, individually or in combination, teach forming a passage in a portion of a chamber liner that lines a bottom of the chamber. Furthermore, neither *Pu* nor *Masuda* teaches both an inlet and an outlet, as positively claimed by claim 11, for circulating fluid in the passage; *Masuda* teaches a single pipe connection for supplying fluid to a passage in a liner (See *Masuda*, FIG. 1, element 104). Despite *Masuda*’s assertion that the fluid can be exchanged, FIG. 1 of *Masuda* shows that the exchange occurs through a single pipe, not through an inlet and out as recited in claim 11.

Thus, claim 11, and claims 12-17 and 20 that depend therefrom, are patentable over *Pu* in view of *Masuda*. Therefore, the Appellants submit that claims 11-17 and 20 as they now stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

2. Claims 38 and 40

Pu and *Masuda* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 38, from which claim 40 depends. Specifically, as discussed above, there is no suggestion or motivation for combining *Pu* and *Masuda* in a manner that would teach, show or suggest a liner adapted for lining a bottom, a sidewall and a substrate support of a processing chamber, wherein the liner has a passage formed therein that is adapted to flow a heat transfer medium therethrough, as recited by claim 38.

Even if combined, the combination of *Pu* and *Masuda* does not teach or suggest the claimed invention, because, at most, the combination would only teach two separate chamber liners, *i.e.*, an inner liner and an outer liner, and a fluid passage formed in the outer liner. The Applicants claim a chamber liner having a bottom that is "coupled between the outer cylindrical wall and the inner cylindrical wall", *e.g.*, to form a single liner component, as recited by independent claim 38. Although *Pu* teaches that a portion of an inner liner may include a bottom, coupling the bottom to the outer liner would run counter to the teachings of *Pu*, which teaches that the inner liner (including the bottom) and the outer liner are formed from different materials (*e.g.*, a dielectric and a thermal conductor, respectively; See *Shan*, page 9, lines 36-44), in order to achieve different purposes. A combination of *Pu* and *Masuda* would therefore require at least two separate, unconnected liners for lining the sidewall and the bottom of the chamber. Thus, *Pu* and *Masuda* do not, individually or in combination, teach forming a single liner component for lining both a chamber sidewall and a chamber bottom, as positively claimed by independent claim 38.

Thus, claim 38, and claim 40 that depends therefrom, are patentable over *Pu* in view of *Masuda*. Therefore, the Appellants submit that claims 38 and 40, as they now stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

3. Claims 47-48 and 55

Pu and *Masuda* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 47, from which claims 48 and 55 depend. Specifically, there is no suggestion or motivation for combining *Pu* and *Masuda* in a manner that would teach, show or suggest a semiconductor processing chamber comprising a chamber liner having at least a first portion having a base substantially covering the bottom of the chamber body and an outer wall disposed proximate to the wall of the chamber body, the chamber liner having a passage fluidly isolated from the chamber volume at least partially formed in the chamber liner and adapted to circulate a heat transfer medium

therethrough, as recited by claim 47.

Even if combined, the combination of *Pu* and *Masuda* does not teach or suggest the claimed invention, because, at most, the combination would only teach a first chamber liner for lining a chamber sidewall and a second chamber liner for lining a substrate support and a chamber bottom, wherein the first liner has a fluid passage formed therein. The Applicants claim a chamber liner having a base that “substantially cover[s] the bottom of the chamber body” and an outer wall “disposed proximate to the wall of the chamber body”, as recited by independent claim 47. *Pu* and *Masuda* do not, individually or in combination, teach a single liner having both a base for covering a chamber bottom and an outer wall for covering a chamber wall, as positively claimed by independent claim 47. In fact, forming a liner that lines both the sidewall and the bottom of a chamber would run counter to the teachings of *Pu*, which teaches that the portions lining the sidewall and the bottom are formed from different materials (e.g., a dielectric and a thermal conductor, respectively; See *Shan*, page 9, lines 36-44).

Thus, claim 47, and claims 48 and 55 that depend therefrom, are patentable over *Pu* in view of *Masuda*. Therefore, the Appellants submit that claims 47-48, as they now stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

4. Claim 51

Pu and *Masuda* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 51. Specifically, there is no suggestion or motivation for combining *Pu* and *Masuda* in a manner that would teach, show or suggest a semiconductor processing chamber comprising a chamber liner disposed against a vertical portion of a substrate support and having a passage at least partially formed therein, as recited by claim 51.

Even if combined, the combination of *Pu* and *Masuda* does not teach or suggest the claimed invention, because, at most, the combination would only teach a first chamber liner for lining a chamber side wall and a second chamber liner for lining a substrate support, wherein the first liner has a fluid passage formed therein. The Applicants claim a chamber liner “disposed against a vertical portion of the substrate support” that has a fluid passage formed therein, as recited by independent claim 51. *Pu* and *Masuda* do not, individually or in combination, teach forming a passage in a portion of a chamber liner that lines a substrate support.

To the contrary, the structure taught by *Masuda*, in which a pipe extends through the chamber wall to the passage in the liner, can not be logically extended to provide fluid to a liner disposed against a substrate support, because it would require the pipe to extend through the processing volume of the chamber, where it would interfere with chamber operations and be subjected to corrosive process byproducts. In addition, extending a fluid supply pipe all the way through the chamber to the substrate support liner would run counter to the teachings of *Pu* by making removal of the liner extremely difficult and time consuming, if not impossible.

Thus, claim 51 is patentable over *Pu* in view of *Masuda*. Therefore, the Appellants submit that claim 51, as it now stands, fully satisfies the requirements of 35 U.S.C. §103 and are patentable thereunder.

5. Claim 53

Pu and *Masuda* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 53. Specifically, there is no suggestion or motivation for combining *Pu* and *Masuda* in a manner that would teach, show or suggest a semiconductor processing chamber comprising a chamber liner circumscribing the substrate support and adapted to be removably disposed in the chamber volume, the liner comprising an outer cylindrical wall configured to line the wall of the chamber, an inner cylindrical wall configured to line the substrate support, a bottom connecting the outer cylindrical wall and the

inner cylindrical wall, and a passage disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough, as recited by claim 53.

Even if combined, the combination of *Pu* and *Masuda* does not teach or suggest the claimed invention, because, at most, the combination would only teach a first chamber liner for lining a chamber side wall and a second chamber liner for lining a substrate support and a chamber bottom, wherein the first liner has a fluid passage formed therein. The Applicants claim a chamber liner having an outer wall "configured to line the wall of the chamber", an inner wall "configured to line the substrate support" and a bottom connecting the outer and inner walls, the liner being "removably disposed in the chamber volume, as recited by independent claim 53. *Pu* and *Masuda* do not, individually or in combination, teach a single liner having both an inner wall and an outer wall connected by a bottom, as positively claimed by independent claim 53.

In fact, forming such a single, unitary liner would run counter to the teachings of *Pu*, which teaches that the inner liner and the outer liner are formed from different materials (e.g., a dielectric and a thermal conductor, respectively; See *Shan*, page 9, lines 36-44) and may be used independent of each other. A combination of *Pu* and *Masuda* would therefore require at least two separate, unconnected liners.

Thus, claim 53 is patentable over *Pu* in view of *Masuda*. Therefore, the Appellants submit that claim 53, as it now stands, fully satisfies the requirements of 35 U.S.C. §103 and are patentable thereunder.

B. 35 U.S.C. §103 - *Pu* in view of *Masuda* and further in view of *Reimold*

The Examiner's conclusions regarding the patentability of claim 18 over *Pu* in view of *Masuda* and further in view of *Reimold* are incorrect. In particular, there is no motivation to combine *Pu*, *Masuda* and *Reimold* in a manner that teaches or suggests all of the limitations recited by claim 18.

Claim 18 depends from claim 11 and recites additional limitations therefore. Specifically, claim 18 recites first and second bosses projecting from the liner base and in fluid communication with the inlet and the outlet of the passage, respectively. As discussed, there is no motivation or suggestion to combine the teachings of *Pu* and *Masuda* in a manner that would yield the invention recited by independent claim 11. Specifically, the combination of *Pu* and *Masuda* does not teach, show or suggest a chamber liner having a base substantially covering the bottom of the chamber body and having a substantially annular passage formed therein for circulating a fluid.

Reimold does not bridge this gap in the teachings of *Pu* and *Masuda*. *Reimold* teaches a heat exchanger comprising a jacket tube that includes a plurality of interfaces for the supply or removal of a heat exchanging medium. As the heating exchanging fluid taught by *Masuda* is provided by a simple inlet pipe and is confined to the hollow space in the jacket, and because *Masuda* does not appear describe an outlet or means for evacuating the fluid from the hollow space, there is little need for a heat exchanger such as that described by *Reimold*, in which a plurality of bosses are provided for establishing a plurality of connections to other components. Therefore, the heat exchanger taught by *Reimold* would not necessarily provide any benefit to or enhancement of the advantages sought by the teachings of *Pu* and *Masuda*. Thus, the Appellants submit that the Examiner is exercising hindsight in using the references to obviate the claims at issue.

Thus, the Examiner has failed to establish a prima facie case because there is no suggestion or motivation to combine *Pu*, *Masuda* and *Reimold* in a manner to teach, show or suggest a chamber liner having a base substantially covering the bottom of the chamber body and having a substantially annular passage formed therein for circulating a fluid, and first and second bosses projecting from the liner base and in fluid communication with an inlet and an outlet of the passage, respectively, as disclosed by Appellants. As such, the Examiner failed to properly show that *Pu* in view of *Masuda* and further in view of *Reimold* teaches, shows or suggests all of the features required to sustain the

Examiner's rejection under 35 U.S.C. §103 of the Appellants' invention of claim 18.

C. 35 U.S.C. §103 - *Pu* in view of *Masuda* and further in view of *Collins I*

The Examiner's conclusions regarding the patentability of claims 19, 54 and 56-58 over *Pu* in view of *Masuda* and further in view of *Collins I* are incorrect. In particular, there is no motivation to combine *Pu*, *Masuda* and *Collins I* in a manner that teaches or suggests all of the limitations recited by claims 19, 54 and 56-58.

Primarily, the Appellants submit that there is no motivation for modifying the system taught by *Pu* with the teachings of *Masuda* and the teachings of *Collins I* in a manner that would yield the claimed invention. As discussed above, there is no motivation or suggestion to combine the teachings of *Pu* and *Masuda* in a manner that would yield a chamber liner having a base substantially covering the bottom of the chamber body and having a substantially annular passage formed therein for circulating a fluid, as recited by the Appellants' claims.

Collins I does not bridge this gap in the teachings of *Pu* and *Masuda*. *Collins I* teaches a pair of magnets disposed within the walls of a processing chamber (*i.e.*, not within an inner chamber liner). The magnets are adapted to confine the plasma to prevent plasma flow from escaping the chamber and entering a pumping annulus. Thus, whereas *Pu* and *Masuda* are concerned with reducing the amount of deposition on the walls and/or pedestal of the chamber, *Collins I* is concerned with preventing plasma from traveling to certain portions of the chamber (*i.e.*, prevent plasma from escaping the chamber or depositing on ports to the chamber exterior). Therefore, the magnets taught by *Collins I* would have to be positioned proximate to the exhaust port in a liner of *Pu* or *Masuda* to prevent plasma from passing through a port in the liner. As the inner wall of the present invention does not contain a port, there is no motivation to provide a magnet on the inner wall of the liner as recited by the claims.

The Examiner submits, in the Advisory Action, that a broad, reasonable interpretation of the meaning of "inner wall" is clearly met by the teachings of *Collins I*. However, the Appellants respectfully submit that this broad reading overlooks a key aspect of the present invention, which is that the liner is removable. Moreover, the respective apparatuses taught by both *Pu* and *Masuda* are described as being removable. However, there is no suggestion or teaching in *Collins I* to indicate that the magnets incorporated therein are anything other than fixed (e.g., not removable from the chamber). Thus, there is no motivation to combine the teachings of *Collins I* with those of *Pu* and *Masuda* in a manner that would yield the claimed invention.

Thus, the Examiner has failed to establish a prima facie case because there is no motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest forming a fluid passage within a processing chamber liner having a base and at least an inner wall and positioning magnets within the inner wall, as claimed by Appellants. The Examiner is using hindsight to employ the claimed invention as a framework to select elements from divergent teachings. As such, the Examiner fails to properly show that *Pu* in view of *Masuda* and further in view of *Collins I* teaches, shows or suggests all of the features required to sustain the Examiner's rejection under 35 U.S.C. §103 of the Appellants' claimed invention.

1. Claim 19

Pu, *Masuda*, and *Collins I* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 11, from which claim 19 depends. Moreover, *Pu*, *Masuda*, and *Collins I* do not teach, show or suggest the additional limitation of a magnet disposed within an inner wall of the liner, the inner wall being connected to the base, as recited by claim 19.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest a chamber liner having a base substantially covering the bottom of the chamber body and having a substantially annular passage formed therein for circulating a fluid, and a magnet disposed

within an inner wall of the liner, the inner wall being connected to the base, as disclosed by Appellants in claim 19.

Therefore, claim 19 is patentable over *Pu* in view of *Masuda* and further in view of *Collins*. Therefore, the Appellants submit that claim 19 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

2. Claim 54

Pu, *Masuda*, and *Collins I* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 38, from which claim 54 depends. Moreover, *Pu*, *Masuda*, and *Collins I* do not teach, show or suggest the additional limitation of a magnet disposed within the inner wall of the liner, as recited by claim 54.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest an apparatus for lining a process volume defined by sidewalls of a semiconductor processing chamber comprising an outer cylindrical wall configured to line the sidewalls of the chamber, an inner cylindrical wall configured to line a substrate support disposed in the process volume of the chamber, a bottom coupled between the outer cylindrical wall and the inner cylindrical wall, and a passage at least partially formed in the liner and isolated from the process volume, the passage being adapted to flow a heat transfer medium therethrough, and a magnet disposed in the inner wall, as disclosed by Appellants in claim 54.

Therefore, claim 54 is patentable over *Pu* in view of *Masuda* and further in view of *Collins*. Therefore, the Appellants submit that claim 54 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

3. Claim 56

Pu, *Masuda*, and *Collins I* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 47, from which claim 56 depends. Moreover, *Pu*, *Masuda*, and *Collins I* do not teach, show or suggest the additional limitation of a magnet disposed within the inner wall of the liner, as

recited by claim 56.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest a semiconductor processing chamber comprising a chamber liner having at least a first portion having a base substantially covering the bottom of the chamber body and an outer wall disposed proximate to the wall of the chamber body, the chamber liner having a passage fluidly isolated from the chamber volume at least partially formed in the chamber liner and adapted to circulate a heat transfer medium therethrough, and a magnet disposed in the inner wall, as disclosed by Appellants in claim 56.

Therefore, claim 56 is patentable over *Pu* in view of *Masuda* and further in view of *Collins*. Therefore, the Appellants submit that claim 56 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

4. Claim 57

Pu, *Masuda*, and *Collins I* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 51, from which claim 57 depends. Moreover, *Pu*, *Masuda*, and *Collins I* do not teach, show or suggest the additional limitation of a magnet disposed within the inner wall of the liner, as recited by claim 56.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest a semiconductor processing chamber comprising a chamber liner disposed against a vertical portion of a substrate support and having a passage at least partially formed therein, and a magnet disposed in the liner, as disclosed by Appellants in claim 57.

Therefore, claim 57 is patentable over *Pu* in view of *Masuda* and further in view of *Collins*. Therefore, the Appellants submit that claim 57 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

5. Claim 58

Pu, *Masuda*, and *Collins I* do not, individually or in combination, teach, show or suggest all of the limitations of independent claim 47, from which claim 53 depends. Moreover, *Pu*, *Masuda*, and *Collins I* do not teach, show or suggest the additional limitation of a magnet disposed within the inner wall of the liner, as recited by claim 58.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins I* in a manner to teach, show or suggest a semiconductor processing chamber comprising a chamber liner circumscribing the substrate support and adapted to be removably disposed in the chamber volume, the liner comprising an outer cylindrical wall configured to line the wall of the chamber, an inner cylindrical wall configured to line the substrate support, a bottom connecting the outer cylindrical wall and the inner cylindrical wall, and a passage disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough, and a magnet disposed in the inner cylindrical wall, as disclosed by Appellants in claim 58.

Therefore, claim 58 is patentable over *Pu* in view of *Masuda* and further in view of *Collins I*. Therefore, the Appellants submit that claim 58 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

D. 35 U.S.C. §103 - *Pu* in view of *Masuda* and further in view of *Shan*

The Examiner's conclusions regarding the patentability of claims 21-24 and 49-50 over *Pu* in view of *Masuda* and further in view of *Shan* are incorrect. As discussed above, *Shan* teaches exactly the same liners that are taught by *Pu*; *Pu* incorporates *Shan* by reference in order to more fully describe the liners depicted therein. Thus, for the purposes of the Examiner's rejection, *Shan* is merely redundant and does not add any substantially new teachings to those already taught by *Pu* and *Masuda*. Therefore, for at least the same reasons set forth above with respect to the Examiner's rejections over *Pu* in view of *Masuda*, claims 21-24 and 49-50 are patentable over *Pu* in view of *Masuda* and further in

view of *Shan*.

E. 35 U.S.C. §103 - *Pu* in view of *Masuda* and further in view of *Collins II*

The Examiner's conclusions regarding the patentability of claim 42 over *Pu* in view of *Masuda* and further in view of *Collins II* are incorrect. In particular, there is no motivation to combine *Pu*, *Masuda* and *Collins II* in a manner that teaches or suggests all of the limitations recited by claim 42.

Claim 42 depends from claim 38 and recites additional limitations therefore. Specifically, claim 42 a passage formed at least partially in the bottom of the liner. As discussed, there is no motivation or suggestion to combine the teachings of *Pu* and *Masuda* in a manner that would yield the invention recited by independent claim 38. Specifically, the combination of *Pu* and *Masuda* does not teach, show or suggest a chamber liner having a base substantially covering the bottom of the chamber body and having a substantially annular passage formed therein for circulating a fluid.

Collins II does not bridge this gap in the teachings of *Pu* and *Masuda*. *Collins II* teaches an optional liner for covering the surfaces of a pumping annulus in a processing chamber, to prevent polymers from accumulating on the pumping annulus. The liner is thermally coupled to a cold sink for regulating, from the exterior, the temperature of the liner and for controlling polymer materials that are attracted to the pumping annulus. *Collins II* does not teach, show or suggest that substantial portions of the chamber body (e.g., chamber walls, substrate supports, a bottom) may be lined, nor does it teach, show or suggest channels formed in the liner for circulating a fluid to control the temperature of the liner from within.

Thus, there is no suggestion or motivation to combine *Pu*, *Masuda* and *Collins II* in a manner to teach, show or suggest an apparatus for lining a process volume defined by sidewalls of a semiconductor processing chamber comprising an outer cylindrical wall configured to line the sidewalls of the chamber, an inner cylindrical wall configured to line a substrate support disposed in the process volume of the chamber, a bottom coupled between the outer cylindrical wall and

the inner cylindrical wall, and a passage at least partially formed in the bottom of the liner and isolated from the process volume, the passage being adapted to flow a heat transfer medium therethrough, as disclosed by Appellants in claim 42.

Therefore, claim 42 is patentable over *Pu* in view of *Masuda* and further in view of *Collins II*. Therefore, the Appellants submit that claim 42 as it now stands fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

F. 35 U.S.C. §103 – *Shan* in view of *Masuda*

The Examiner's conclusions regarding the patentability of claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 over *Pu* in view of *Shan* are incorrect. As discussed above, *Shan* teaches the same shields taught by *Pu*; *Pu* incorporates *Shan* by reference in order to more fully describe the shields depicted therein. As also discussed above, the combination of *Pu* and *Masuda* fails to teach, show or suggest all of the limitations of Appellants' claimed invention. Thus, for at least the same reasons set forth above with respect to the Examiner's rejection over *Pu* in view of *Masuda*, the combination of *Shan* and *Masuda* also fails to teach, show or suggest the invention recited in claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55.

G. 35 U.S.C. §103 - *Shan* in view of *Masuda* and further in view of *Reimold*

The Examiner's conclusions regarding the patentability of claim 18 over *Shan* in view of *Masuda* and further in view of *Reimold* are incorrect. For at least the same reasons set forth above with respect to the Examiner's rejection of claim 18 over the combination of *Pu*, *Masuda* and *Reimold*, there is no motivation to combine *Shan*, *Masuda* and *Reimold* in a manner that teaches or suggests all of the limitations recited by claim 18.

H. **35 U.S.C. §103 - *Shan* in view of *Masuda* and further in view of *Collins I***

The Examiner's conclusions regarding the patentability of claims 19, 54 and 56-58 over *Shan* in view of *Masuda* and further in view of *Collins I* are incorrect. For at least the same reasons set forth above with respect to the Examiner's rejection of claims 19, 54 and 56-58 over the combination of *Pu*, *Masuda* and *Collins I*, there is no motivation to combine *Shan*, *Masuda* and *Collins I* in a manner that teaches or suggests all of the limitations recited by claims 19, 54 and 56-58.

I. **35 U.S.C. §103 - *Shan* in view of *Zhao***

The Examiner's conclusions regarding the patentability of claims 26 and 28 over *Shan* in view of *Zhao* are incorrect. In particular, there is no motivation to combine *Shan* and *Zhao* in a manner that teaches or suggests all of the limitations recited by claims 26 and 28.

Primarily, the Appellants submit that there is no motivation for modifying the system taught by *Shan* with the teachings of *Zhao* in a manner that would yield the claimed invention. As discussed above, *Shan* teaches a liner having a first portion that covers a chamber wall and a second portion that covers a bottom and a substrate support. *Zhao* teaches a chemical vapor deposition chamber having a substrate pedestal, a first liner than lines the chamber lid, a separate second liner that lines the chamber side wall and a showerhead in the lid assembly that has a plurality of nozzles for distributing a flow of processing gas over a substrate positioned on the pedestal. There is no motivation to combine the teachings of *Shan* and *Zhao* in a manner that would yield a processing chamber liner having a first portion having a base substantially covering a bottom of the chamber body and an outer wall disposed proximate to a wall of the chamber body, and a second portion disposed proximate to a lid of the chamber and having a wall extending downward along the wall of the chamber body to the outer wall of the first portion of the liner, and a plurality of apertures formed in the second portion of the liner, as recited by claim 26.

Moreover, even if combined, the combination of *Shan* and *Zhao* does not teach or suggest the claimed invention, because, at most, the combination would only teach two separate chamber liners, *i.e.*, an inner liner and an outer liner, and a plurality of apertures having nozzles formed in one of the liners. The Applicants claim a chamber liner having a first portion that has a base “substantially covering a bottom of the chamber body” and an outer wall disposed proximate to a chamber wall, and a second portion “disposed proximate a lid of the chamber body” and a wall that extends downward toward the first portion outer wall. Neither *Shan* nor *Zhao* teaches a chamber liner that lines both a sidewall of the chamber and the bottom of the chamber. Neither do the references teach a first liner for lining a lower part of a chamber (*i.e.*, the bottom and the sidewall) and a second portion for lining an upper part of the chamber (*i.e.*, the lid and the sidewall).

Furthermore, although *Shan* teaches that a portion of an inner liner may include a bottom, coupling the bottom to the outer liner would run counter to the teachings of *Shan*, which teaches that the inner liner (including the bottom) and the outer liner are formed from different materials (*e.g.*, a dielectric and a thermal conductor, respectively; See *Shan*, page 9, lines 36-44), in order to achieve different purposes. A combination of *Shan* and *Zhao* would therefore require at least two separate, unconnected liners for lining the sidewall and the bottom of the chamber. Thus, *Shan* and *Zhao* do not, individually or in combination, teach forming a single liner component for lining both a chamber sidewall and a chamber bottom, as positively claimed by independent claim 26.

Therefore, the Examiner fails to properly show that *Shan* in view of *Zhao* teaches, shows or suggests all of the features required to sustain the Examiner’s rejection under 35 U.S.C. §103 of the Appellants’ claim 26.

J. 35 U.S.C. §103 - *Shan* in view of *Zhao* and further in view of *Takeuchi*

The Examiner’s conclusions regarding the patentability of claim 27 over *Shan* in view of *Zhao* and further in view of *Takeuchi* are incorrect. Specifically, the combination of *Shan*, *Zhao* and *Takeuchi* does not teach, show or suggest all

of them limitations of claim 26, from which claim 27 depends. Claim 27 recites the additional limitation of forming the nozzle from quartz, silicon carbide, silicon, aluminum nitride, aluminum oxide or a combination thereof.

Takeuchi does not bridge the gap in the teachings of *Shan* and *Zhao*. *Takeuchi* teaches a plasma processing system in which a gas inlet nozzle comprised of quartz extends through a chamber side wall. There is no suggestion or motivation to adapt the one aperture of *Shan* to incorporate the nozzles of *Zhao*, and further to form the nozzles of quartz as taught by *Takeuchi*.

Thus, there is no motivation to combine *Shan*, *Zhao* and *Takeuchi* in a manner to teach, show or suggest a processing chamber liner having a first portion having a base substantially covering a bottom of the chamber body and an outer wall disposed proximate to a wall of the chamber body, and a second portion disposed proximate to a lid of the chamber and having a wall extending downward along the wall of the chamber body to the outer wall of the first portion of the liner, and a plurality of apertures formed in the second portion of the liner, wherein nozzles comprised of quartz, silicon carbide, silicon, aluminum nitride, aluminum oxide or a combination thereof are disposed in the apertures

Therefore, the Examiner fails to properly show that *Shan* in view of *Zhao* and further in view of *Takeuchi* teaches, shows or suggests all of the features required to sustain the Examiner's rejection under 35 U.S.C. §103 of the Appellants' claim 27.

K. 35 U.S.C. §103 - *Shan* in view of *Zhao* and further in view of *Banholzer*

The Examiner's conclusions regarding the patentability of claim 37 over *Shan* in view of *Zhao* and further in view of *Banholzer* are incorrect. Specifically, the combination of *Shan*, *Zhao* and *Banholzer* does not teach, show or suggest all of them limitations of claim 26, from which claim 37 depends. Claim 37 recites the additional limitation of a second side of the liner that is texturized.

Banholzer does not bridge the gap in the teachings of *Shan* and *Zhao*. *Banholzer* teaches a vacuum chamber in which shield positioned with the chamber is treated to roughen its surface to increase the adhesion of deposited materials. There is no suggestion or motivation to adapt the shield of *Shan* to have a texturized surface. The primary function of the shield taught by *Shan* is to electrically insulate the chamber wall to control the DC bias of the substrate support; there is no teaching in *Shan* that would suggest that the dielectric properties of the shield would be enhanced by or that the shield would in any way benefit from having a texturized surface. In fact, a texturized surface might undesirably affect the dielectric properties of shield.

Therefore, the Examiner fails to properly show that *Shan* in view of *Zhao* and further in view of *Banholzer* teaches, shows or suggests all of the features required to sustain the Examiner's rejection under 35 U.S.C. §103 of the Appellants' claim 37.

L. 35 U.S.C. §103 - *Shan* in view of *Masuda* and further in view of *Collins II*

The Examiner's conclusions regarding the patentability of claim 42 over *Shan* in view of *Masuda* and further in view of *Collins II* are incorrect. For at least the same reasons set forth above with respect to the Examiner's rejection of claim 42 over the combination of *Pu*, *Masuda* and *Collins II*, there is no motivation to combine *Shan*, *Masuda* and *Collins II* in a manner that teaches or suggests all of the limitations recited by claim 42.

M. 35 U.S.C. §103 - *Shan* in view of *Masuda* and further in view of *Zhao*

The Examiner's conclusions regarding the patentability of claim 52 over *Shan* in view of *Masuda* and further in view of *Zhao* are incorrect. As discussed above, there is no motivation or suggestion to combine the teachings of *Shan* and *Masuda* in a manner that would yield a processing chamber liner comprising a cylindrical wall having an upper end closed by a top member, the cylindrical wall adapted to line a portion of the chamber volume, a passage formed in the

top member being fluidly isolated from the chamber volume, as recited by claim 52.

Zhao does not bridge the gap in the teachings of *Shan* and *Masuda*; thus, the combination of *Shan*, *Masuda* and *Zhao* fails to make obvious a processing chamber liner comprising a cylindrical wall having an upper end closed by a top member, the cylindrical wall adapted to line a portion of the chamber volume, a passage formed in the top member being fluidly isolated from the chamber volume and a plurality of apertures formed in the top member, wherein a nozzle is disposed in at least one of the apertures (e.g., the apertures and nozzle are disposed in the top member of the liner).

Therefore, the Examiner fails to properly show that *Shan* in view of *Masuda* and further in view of *Zhao* teaches, shows or suggests all of the features required to sustain the Examiner's rejection under 35 U.S.C. §103 of the Appellants' claim 52.

CONCLUSION

For the reasons advanced above, Appellants respectfully urge that the rejection of Claims 11-24, 26-28, 37-38, 40, 42 and 47-58 as being unpatentable under 35 U.S.C. §103 is improper. Reversal of the rejections in this appeal is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. A check in the amount of \$330.00 for the Appeal Brief under 37 C.F.R. §1.17(c) is enclosed. If necessary, please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 20-0782, and please credit any excess fees to the above referenced deposit account.

Respectfully submitted,

June 3, 2004



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I hereby certify that this correspondence is being deposited on June 3, 2004 with the United States Postal Service as first-class mail, with sufficient postage, in an envelope addressed to Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Allyson M. DeVesty
Signature

6-3-04
Date of signature

APPENDIX I

PENDING CLAIMS

1-10. (Cancelled)

11. (Previously Presented) A semiconductor processing chamber comprising:
a chamber body having a wall, a bottom and a lid assembly defining a chamber volume;

a substrate support disposed within the chamber volume; and,

a chamber liner disposed in the chamber volume and having a base substantially covering the bottom of the chamber body, the base having a substantially annular passage formed therein and fluidly isolated from the chamber volume, the base having an inlet and outlet adapted to circulate a fluid through the passage.

12. (Original) The chamber of claim 11 wherein the chamber liner further comprises at least one of:

a first liner disposed proximate the lid assembly; or

a second liner disposed about the substrate support.

13. (Previously Presented) The chamber of claim 11 wherein the chamber liner is retained in the chamber by a clamp affixed to the chamber body.

14. (Original) The chamber of claim 11 wherein the chamber liner is comprised of a thermally conductive material.

15. (Original) The chamber of claim 11 wherein the chamber liner is comprised of a material selected from the group of aluminum, ceramic and stainless steel.

16. (Previously Presented) The apparatus of claim 12 wherein the second liner further comprises:

an inner wall connected to the base.

17. (Previously Presented) The apparatus of claim 11 wherein the chamber liner further comprises:

an outer wall connected to an outer edge of the base and extending upwards against the wall of the chamber body.

18. (Previously Presented) The apparatus of claim 11 wherein the chamber liner further comprises:

a first and second boss projecting from the base, the first boss comprising a hole in fluid communication with the passage at the inlet, and the second boss comprising a hole in fluid communication with the passage at the outlet.

19. (Original) The apparatus of claim 16 wherein inner wall further comprises a magnet disposed in the inner wall.

20. (Original) The apparatus of claim 17 wherein the outer wall further comprises a pumping port.

21. (Previously Presented) The apparatus of claim 11 wherein the chamber liner further comprises:

an inner wall connected to an inner edge of the base and extending upwards against the substrate support;

an outer wall connected to an outer edge of the base and extending upwards against the wall of the chamber body;

a center member having the passage disposed within;

a flange circumscribing the center member; and,

a cylindrical wall projecting from the center member inside of the flange.

22. (Previously Presented) The apparatus of claim 21 further comprising:
a lid disposed opposite the cylindrical wall, the lid and the wall defining a plenum at least partially therebetween.
23. (Previously Presented) The apparatus of claim 22 wherein the center member further comprises:
a plurality of nozzles disposed in the center member providing fluid access to the plenum.
24. (Original) The apparatus of claim 22 further comprising:
a gas feedthrough fluidly coupled to the plenum through a hole disposed in the lid.
25. (Cancelled)
26. (Previously Presented) Apparatus for lining a semiconductor processing chamber comprising:
a lid having an inlet;
a liner disposed proximate the lid, the liner having:
a first portion having a base substantially covering a bottom of a chamber body and an outer wall disposed proximate a wall of the chamber body;
a second portion disposed proximate a lid of the chamber body and having a second portion wall extending downward along the wall of the chamber body to the outer wall of the first portion of the liner; and
a plurality of apertures formed in the second portion of the liner;
a plenum at least partially defined between the lid and the second portion of the liner; and
a nozzle disposed in at least one of apertures for flowing fluid from the plenum through the second portion of the liner.

27. (Original) The apparatus of claim 26, wherein the nozzle is comprised of quartz, silicon carbide, silicon, aluminum nitride, aluminum oxide or combinations thereof.

28. (Original) The apparatus of claim 26, wherein the liner further comprises:
a channel having an inlet and an outlet disposed in the liner.

29.-36. (Cancelled)

37. (Previously Presented) The apparatus of claim 26, wherein a second side of the liner is textured.

38. (Previously Presented) Apparatus for lining a process volume defined by sidewalls of a semiconductor processing chamber comprising:

a liner adapted to be removably disposed in the process volume, the liner comprising:

an outer cylindrical wall configured to line the sidewalls of the chamber;

an inner cylindrical wall configured to line a substrate support disposed in the process volume of the chamber;

a bottom coupled between the outer cylindrical wall and the inner cylindrical wall; and

a passage at least partially formed in the liner and isolated from the process volume, the passage being adapted to flow a heat transfer medium therethrough.

39. (Cancelled)

40. (Previously Presented) The apparatus of claim 38, wherein the passage is formed at least partially in the cylindrical wall.

41. (Cancelled)

42. (Previously Presented) The apparatus of claim 38, wherein the passage is formed at least partially in the bottom.

43.—46. (Cancelled)

47. (Previously Presented) A semiconductor processing chamber comprising:
a chamber body having a wall, a bottom and a lid assembly defining a chamber volume;

a substrate support disposed within the chamber volume; and,

a chamber liner having at least a first portion having a base substantially covering the bottom of the chamber body and an outer wall disposed proximate the wall of the chamber body, the chamber liner having a passage fluidly isolated from the chamber volume at least partially formed in the chamber liner and adapted to circulate a heat transfer medium therethrough.

48. (Previously Presented) The chamber of claim 47, wherein the chamber liner further comprises:

a second portion disposed proximate the lid assembly and having a second portion wall extending downward along the wall of the chamber body to the outer wall of the first portion of the liner and a cover closing one end of the second portion wall.

49. (Previously Presented) The chamber of claim 48, wherein the cover of the second portion of the chamber liner further comprises:

a plurality of apertures formed therethrough.

50. (Previously Presented) The chamber of claim 49 further comprising a plate disposed on the chamber liner and forming a plenum therewith, the plenum in fluid communication with the chamber volume through the apertures.

51. (Previously Presented) A semiconductor processing chamber comprising:
a chamber body having a wall, a bottom and a lid assembly defining a chamber volume;

a substrate support disposed within the chamber volume; and,

a chamber liner disposed against a vertical portion of the substrate support, the chamber liner having a passage fluidly isolated from the chamber volume at least partially formed in the chamber liner.

52. (Previously Presented) Apparatus for lining a chamber volume of a semiconductor processing chamber, comprising:

a cylindrical wall having an upper end closed by a top member, the cylindrical wall adapted to line a portion of the chamber volume;

a plurality of apertures in the top member;

a passage formed in the top member and fluidly isolated from the chamber volume; and

a nozzle disposed in at least one of the apertures.

53. (Previously Presented) A semiconductor processing chamber comprising:

a wall, a bottom and a lid assembly defining a chamber volume;

a substrate support disposed within the chamber volume; and

a chamber liner circumscribing the substrate support and adapted to be removably disposed in the chamber volume, the liner comprising:

an outer cylindrical wall configured to line the wall of the chamber;

an inner cylindrical wall configured to line the substrate support;

a bottom connecting the outer cylindrical wall and the inner cylindrical wall;

and

a passage disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough.

54. (Previously Presented) The apparatus of claim 38, wherein the inner wall further comprises a magnet disposed in the inner wall.

55. (Previously Presented) The apparatus of claim 47, wherein the chamber liner further comprises an inner wall extending from the base inward of the outer wall.

56. (Previously Presented) The processing chamber of claim 55, wherein the inner wall further comprises a magnet disposed therein.

57. (Previously Presented) The processing chamber of claim 51, wherein the chamber liner further comprises a magnet disposed therein.

58. (Previously Presented) The processing chamber of claim 53, wherein the inner cylindrical wall further comprises a magnet disposed therein.